

15

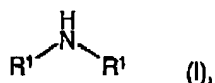
We claim:

1. A process for preparing a symmetrical secondary amine by reaction of a primary amine in the presence of hydrogen and a catalyst whose preparation has involved precipitation of catalytically active components onto monoclinic, tetragonal or cubic zirconium dioxide.
5
2. A process as claimed in the preceding claim, wherein the catalytically active components precipitated are salts of a metal selected from transition groups VIII and IB of the Periodic Table.
10
3. A process as claimed in the preceding claim, wherein the metal salts are basic salts which are sparingly soluble or insoluble in water.
4. A process as claimed in either of the two preceding claims, wherein the salts are oxides, hydrated oxides, hydroxides, carbonates and/or hydrogencarbonates.
15
5. A process as claimed in any of claims 2 to 4, wherein the metal is selected from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Pt and Cu.
- 20 6. A process as claimed in any of claims 2 to 4, wherein the metal is selected from the group consisting of Cu, Ni and Co.
7. A process as claimed in any of the preceding claims, wherein the catalytically active composition of the catalyst before treatment with hydrogen comprises from 20 to 85% by weight of oxygen-containing compounds of zirconium, calculated as ZrO_2 , from 1 to 30% by weight of oxygen-containing compounds of copper, calculated as CuO , and from 14 to 70% by weight of oxygen-containing compounds of nickel, calculated as NiO .
25
8. A process as claimed in any of the preceding claims, wherein the catalytically active composition of the catalyst before treatment with hydrogen comprises from 20 to 65% by weight of oxygen-containing compounds of zirconium, calculated as ZrO_2 , from 1 to 30% by weight of oxygen-containing compounds of copper, calculated as CuO , from 15 to 50% by weight of oxygen-containing compounds of nickel, calculated as NiO , and from 15 to 50% by weight of oxygen-containing compounds of cobalt, calculated as CoO .
30
9. A process as claimed in any of claims 5 to 8, wherein the molar ratio of nickel to copper is greater than 1.
35

1 drawing.

16

10. A process as claimed in any of the preceding claims, wherein the monoclinic, tetragonal or cubic zirconium dioxide contains one or more oxides of metals of transition groups IIIB or main group IIA of the Periodic Table.
- 5 11. A process as claimed in any of the preceding claims, wherein the reaction is carried out at from 50 to 250°C.
12. A process as claimed in any of the preceding claims, wherein the reaction is carried out at pressures of from 5 to 350 bar in the gas/liquid phase or in the gas phase.
- 10 13. A process as claimed in any of the preceding claims for preparing a symmetrical secondary amine of the formula I



15 where

R¹ is alkyl such as C₁₋₂₀₀-alkyl, cycloalkyl such as C₃₋₁₂-cycloalkyl, hydroxyalkyl such as C₁₋₂₀-hydroxyalkyl, aminoalkyl such as C₁₋₂₀-aminoalkyl, hydroxyalkylaminoalkyl such as C₂₋₂₀-hydroxyalkylaminoalkyl, alkoxyalkyl such as C₂₋₃₀-alkoxyalkyl, dialkylaminoalkyl such as C₂₋₃₀-dialkylaminoalkyl, alkylaminoalkyl such as C₂₋₃₀-alkylaminoalkyl, aryl, heteroaryl, aralkyl such as C₇₋₂₀-aralkyl, heteroarylalkyl such as C₄₋₂₀-heteroarylalkyl, alkylaryl such as C₇₋₂₀-alkylaryl, alkylheteroaryl such as C₄₋₂₀-alkylheteroaryl, or R³R⁴N-A-, where A = C₁₋₆-alkylene or -CH₂-CH₂-O-(CH₂-CH₂-O)_n-CH₂-CH₂- (where n = 0, 1 or 2) and R³, R⁴ = C₁₋₄-alkyl or together with the N-atom to which they are bound form a piperidine or morpholine ring,

25
30

or the two radicals R¹ together form -(CH₂)_l-CH₂-X-(CH₂)_m-, where

X is CH₂, CHR⁵, oxygen (O), sulfur (S) or NR⁵,

35 R⁵ is hydrogen (H), alkyl such as C₁₋₄-alkyl, alkylphenyl such as C₇₋₄₀-alkylphenyl,

17

l, m are each an integer from 1 to 4,

by reaction of a corresponding primary amine of the formula II or IIa



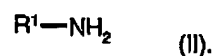
14. A process as claimed in any of claims 1 to 12 for preparing a symmetrical secondary amine of the formula I



where

R^1 is C_{3-10} -dialkylaminoalkyl such as 3-(N,N-dimethylamino)propyl,

- 15 by reaction of a corresponding primary amine of the formula II



- 20 15. The use of a catalyst as claimed in any of claims 1 to 10 for preparing a symmetrical secondary amine by reaction of a primary amine in the presence of hydrogen.